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MEMORANDUM FOR PRS (In-House Publication)

17 Mar 2003

FROM: PROI (STINFO)

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-TM-2003-068**  
Karin Karg & David Powell (Triton Systems, Inc.), "Chopped Fiber Discontinuously Reinforced  
Aluminum"

Jeigh  
55327

**For Oral Presentation to Prospective Commercial Partners (possibly Internat'l) (Statement A)**

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# **Triton Systems, Inc.**

## **Structural Materials Group**

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**978.250.4200 x 137**



**Discontinuous Reinforced Aluminum Composites: Karin M. Karg**  
**978.250.4200 x 201**



**DISTRIBUTION STATEMENT A**  
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# Chopped Fiber Discontinuous Reinforced Aluminum

## Data available to date:

- Tensile testing of Triton's Chopped Fiber Discontinuous Reinforced Aluminum
  - using Triton's Enhanced Pressure Infiltration Casting™ Process
  - using Standard Foundry Process Parameters

- Triton estimates process refinement will enable an additional 10% improvement in properties

## Testing in process:

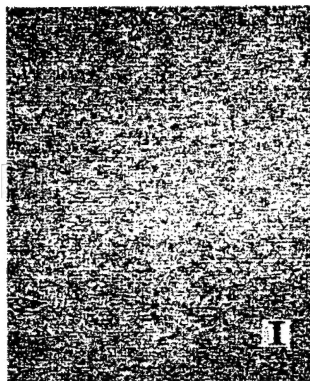
- Fatigue
- Elevated Temperature Tensile Testing
- CTE

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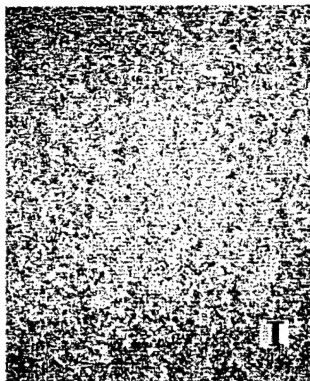


# Chopped Fiber Discontinuous Reinforced Aluminum

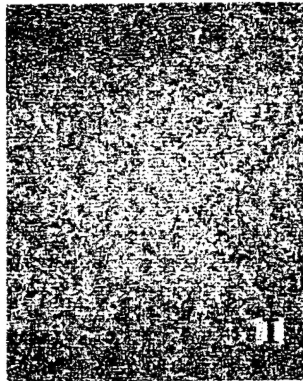
VF%	UTS(MPa)	YS(MPa)	%elong
15	492	350	1.1
15	467	361	1.3
15	433	245	0.9
20	509	370	1.3
20	463	259	1.7
20	412	268	0.9
25	546	296	2.0
25	541	346	1.7
25	524	333	1.6



Front, 50x



Longitudinal, 50x



Thru, 50x

- Test results using cast aluminum reinforced with discontinuous chopped fibers
- High pressure casting process (EPIC™)
- Isotropic
- Process refinement will increase properties >10%

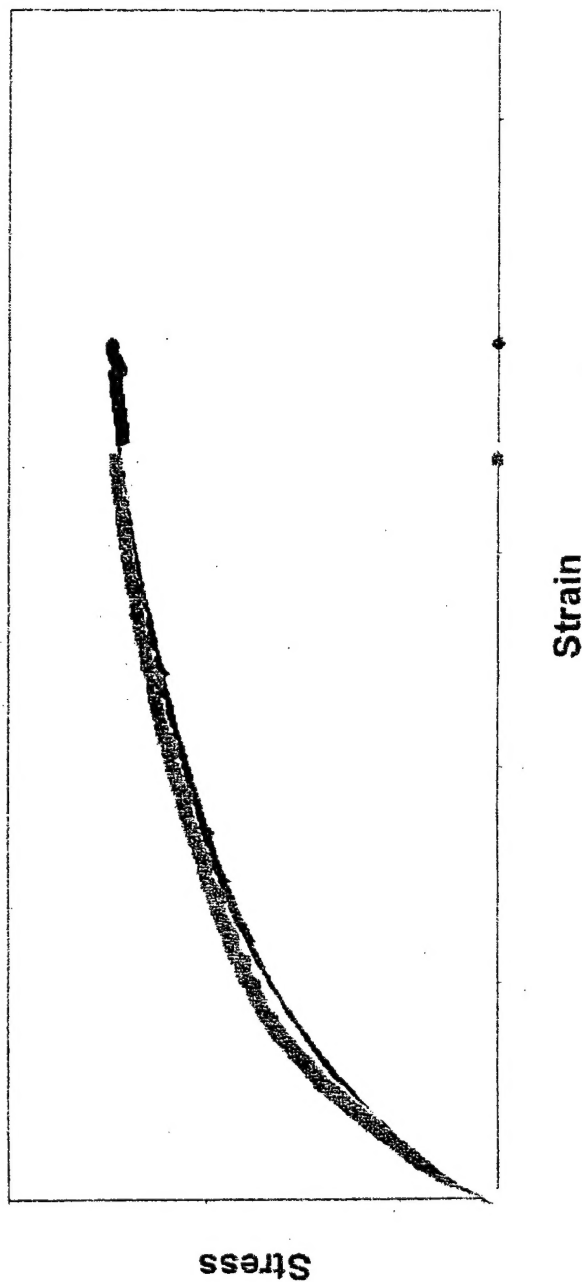
**Triton is currently refining process:**

- ⇒ improve properties and conduct materials characterization
- ⇒ Transition to Standard Foundry Investment Casting process



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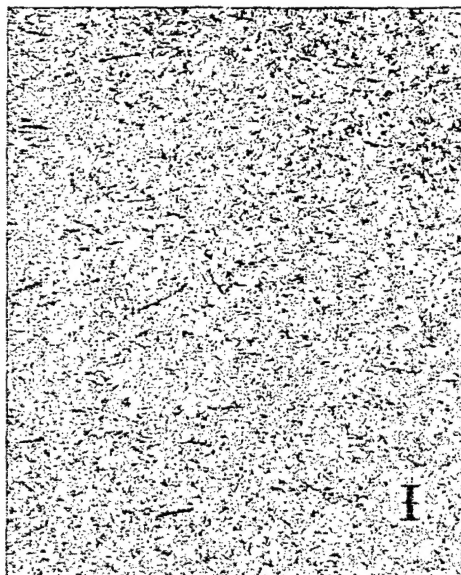
# Chopped Fiber Discontinuous Reinforced Aluminum



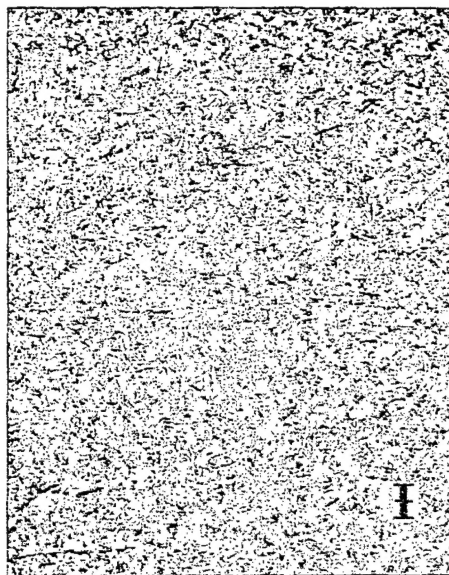
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# Chopped Fiber Discontinuous Reinforced Aluminum

- Early test results using A356 reinforced with chopped fibers
- Typical Foundry Process
- Parameters
- Cast 170mm x 100mm x 6.5 mm panel
- Isotropic
- Consistent structure (over panel)
- Process refinement increase properties >10%



Longitudinal 200x,  
Top of Panel



Longitudinal 200x,  
Bottom of Panel



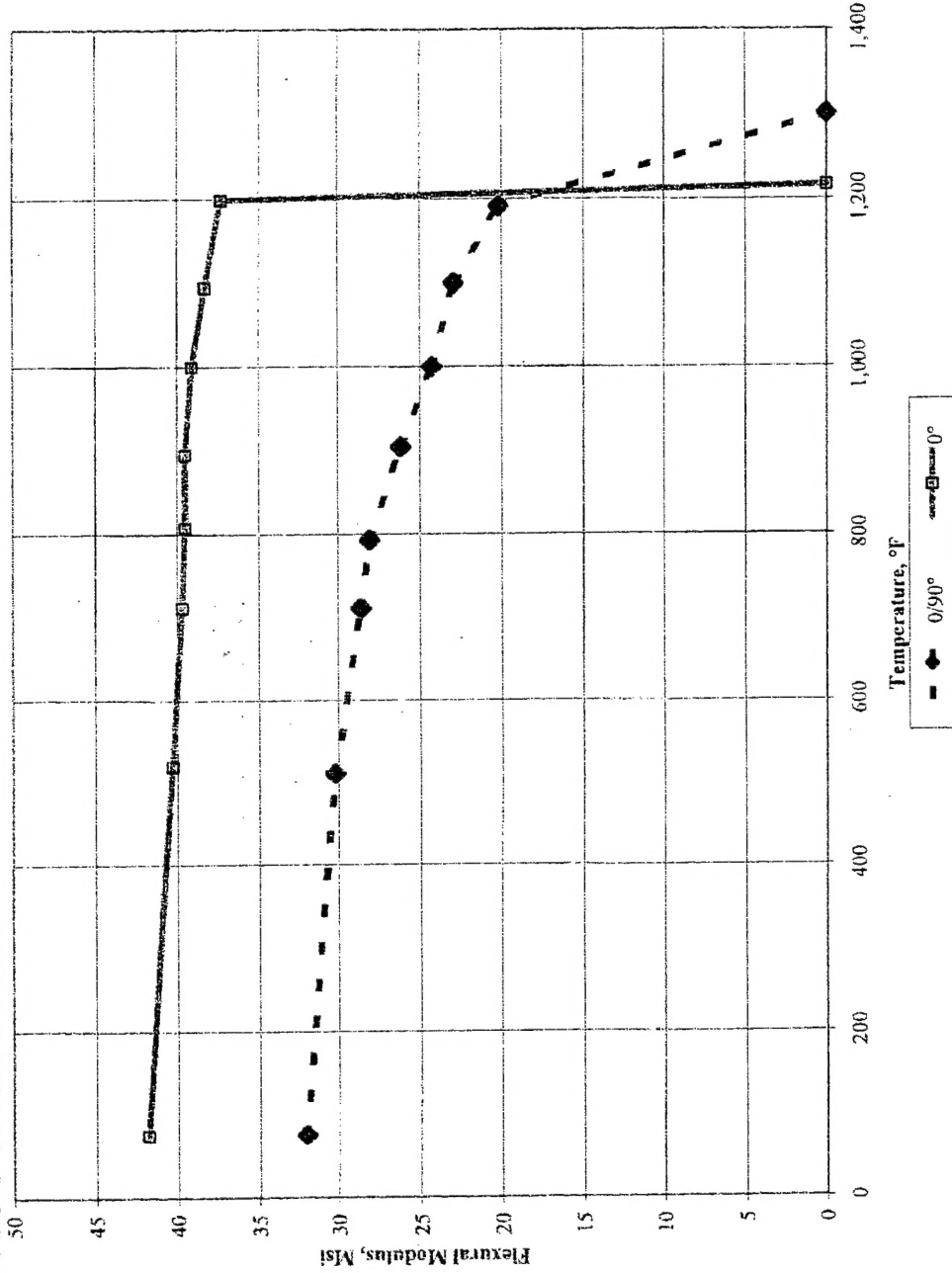
UTS(MPa)	YS(MPa)	%elong
343	261	0.9
337	294	0.7
326	279	0.7

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# Continuous Reinforced Aluminum

## Flexural Modulus vs. Temperature AMC Structural Jacket Material



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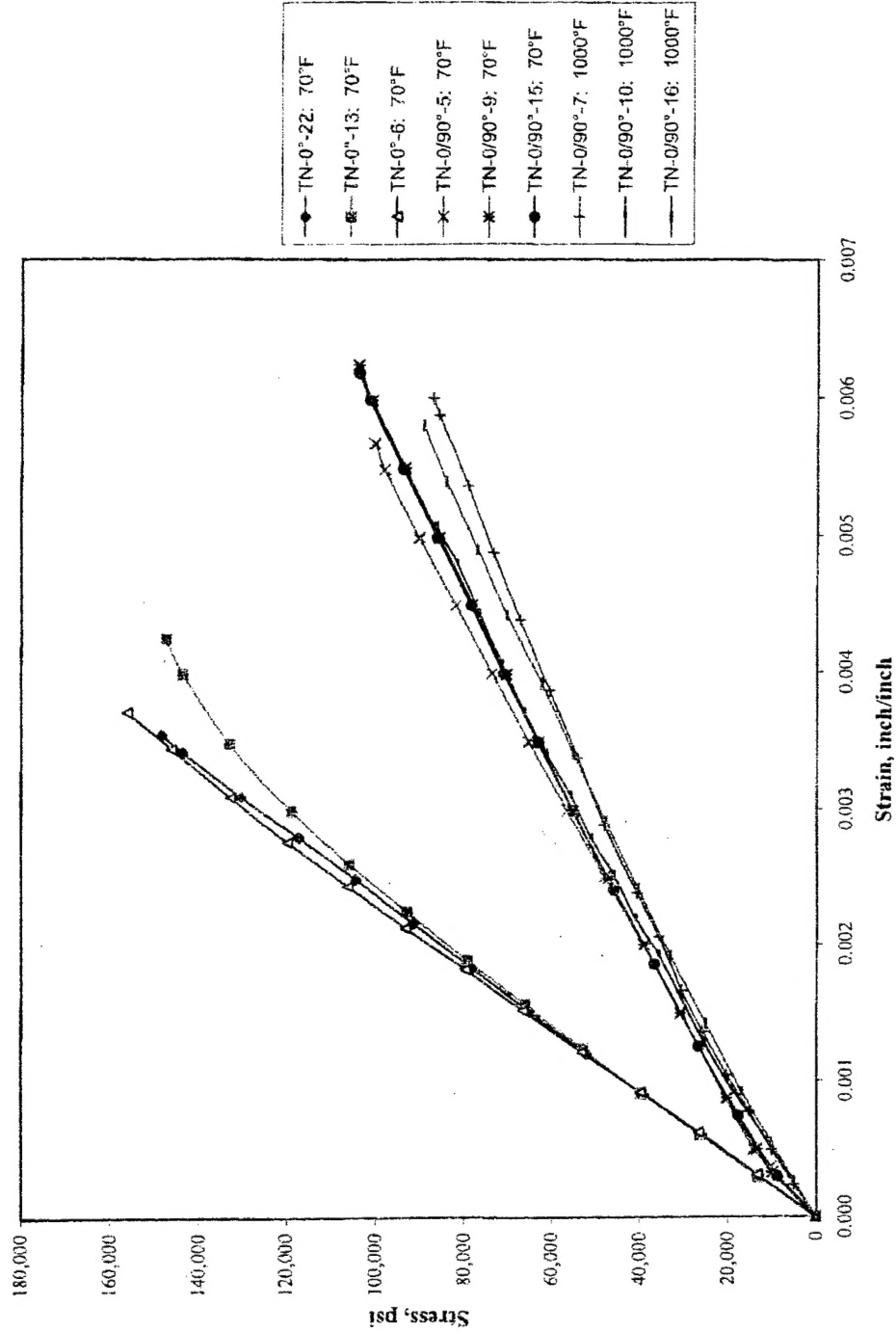
tsi



# Continuous Reinforced Aluminum

## AMC Tensile Test Results

Tensile Stress-Strain Response



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